

**STATE OF VERMONT
PUBLIC SERVICE BOARD**

Docket No. _____

Petition of twenty Vermont utilities and)
Vermont Public Power Supply Authority)
requesting authorization pursuant to 30)
V.S.A. § 248 for the purchase of shares of)
218 MW to 225 MW of electricity from H.Q.)
Energy Services (U.S.) Inc. commencing)
November 1, 2012 through 2038, issuance of)
findings that such purchases are entitled to)
rate recovery assurance, and requesting)
certain approvals under 30 V.S.A. § 108)

**PREFILED TESTIMONY OF
KENNETH A. NOLAN
ON BEHALF OF
CITY OF BURLINGTON, VT ELECTRIC DEPARTMENT**

August 17, 2010

Witness Nolan's prefiled testimony supports (i) why the HQUS PPA is needed to meet BED's demand requirements (Section 248(b)(2)(need)), (ii) how the HQUS PPA provides an economic benefit to BED, its customers and the state (Sections 248(b)(4)(economic benefit)), and is consistent with BED's IRP (Section 248(b)(6)(IRP)).

TABLE OF CONTENTS

1. Introduction.....	1
2. BED's HQUS PPA Power Purchase Entitlements.....	2
3. Section 248(b)(2) – Need	4
4. Section 248(b)(4) – Economic Benefit.....	8
5. Section 248(b)(6) – IRP.....	12

EXHIBITS

Exhibit BED-1	Resume of Kenneth A. Nolan
Exhibit BED-2	BED Demand v. Committed Supply
Exhibit BED-3	BED Demand v. Projected Supply

**STATE OF VERMONT
PUBLIC SERVICE BOARD**

Docket No. _____

Petition of twenty Vermont utilities and)
Vermont Public Power Supply Authority)
requesting authorization pursuant to 30)
V.S.A. § 248 for the purchase of shares of)
218 MW to 225 MW of electricity from H.Q.)
Energy Services (U.S.) Inc. commencing)
November 1, 2012 through 2038, issuance of)
findings that such purchases are entitled to)
rate recovery assurance, and requesting)
certain approvals under 30 V.S.A. § 108)

**PREFILED TESTIMONY OF
KENNETH A. NOLAN
ON BEHALF OF
CITY OF BURLINGTON, VT ELECTRIC DEPARTMENT**

1 **1. Introduction**

2 Q1. Please state your name, occupation and business address.

3 A1. My name is Kenneth A. Nolan. My business address is City of Burlington Electric
4 Department (“BED”), 585 Pine Street, Burlington, VT 05401. I am employed as BED’s
5 Director of Resource Planning responsible for Integrated Resource Planning, power
6 supply procurement, load forecasting, rate design, and demand-side management
7 monitoring and reporting.

8

9 Q2. Please summarize your education, training and professional experience.

10 A2. My qualifications are set forth in my resume, Exhibit BED-1.

1

2 Q3. What is the purpose of your testimony?

3 A3. My testimony supports BED's decision to move forward as a Buyer under the Power
4 Purchase and Sales Agreement ("HQUS PPA") dated as of August 12, 2010 with H.Q.
5 Energy Services (U.S.) Inc. ("HQUS") as Seller. The HQUS PPA is described in the
6 joint prefiled testimony of William Deehan and Christopher Cole and is included with
7 that testimony as Exhibit Petitioners' Joint-3.

8

9 Specifically, my testimony addresses why the HQUS PPA is needed to meet BED's
10 demand requirements (Section 248(b)(2)(need)), how the HQUS PPA provides an
11 economic benefit to BED, its customers and the state (Sections 248(b)(4)(economic
12 benefit)), and explains how the HQUS PPA is consistent with the BED's 2008 Integrated
13 Resource Plan (IRP) (Section 248(b)(6)(IRP)). As such, my testimony complements and
14 supplements the "statewide" joint Deehan/Cole prefiled testimony that is offered on
15 behalf of all Petitioners.

16

17 **2. BED's HQUS PPA Power Purchase Entitlements**

18 Q4. Please describe BED's power purchase entitlements under the HQUS PPA.

19 A4. As described in the Joint Deehan/Cole prefiled testimony, the HQUS PPA includes six
20 schedules for the Energy Quantity, with two allocation tables. At the outset, the Energy

Quantity is subject to the transfer capability limitations at Highgate, which is 218 MW, and therefore 218 MW is the Energy Quantity allocated among the Vermont Buyers. BED's allocation at the 218 MW delivery level meets its supply requirements, so BED does not anticipate receiving any additional Energy Quantity if Highgate's transfer capability is increased to 225 MW during the term of the PPA. The following two tables are from the HQUS PPA and identify BED's and the other Vermont Buyers' allocations:

Vermont Buyers' Allocations of HQUS PPA Energy Quantity at 218 MW

	November 1, 2012 to October 31, 2015	November 1, 2015 to October 31, 2016	November 1, 2016 to October 31, 2020	November 1, 2020 to October 31, 2030	November 1, 2030 to October 31, 2035	November 1, 2035 to October 31, 2038
	MW	MW	MW	MW	MW	MW
BED	0	5	5	9	9	4
CVPS	0	83.119	94.119	95.119	105.809	22.69
GMP	4.821	65.589	75.063	75.063	79.11	18.342
Stowe	1.032	2.884	2.984	2.984	2.251	0.399
VEC	15.236	15.236	15.236	16.236	4.004	4.004
VPPSA	0.911	11.172	15.598	15.598	16.267	6.006
Vermont Marble	3	4	4	4	1.559	0.559
Total	25	187	212	218	218	56

Vermont Buyer Allocations of HQUS PPA Energy Quantity at 225 MW

	November 1, 2012 to October 31, 2015	November 1, 2015 to October 31, 2016	November 1, 2016 to October 31, 2020	November 1, 2020 to October 31, 2030	November 1, 2030 to October 31, 2035	November 1, 2035 to October 31, 2038
	MW	MW	MW	MW	MW	MW
BED	0	5	5	9	9	4
CVPS	0	85.419	96.419	98.419	112.101	26.682
GMP	7.017	67.485	76.959	76.959	81.293	20.825
Stowe	1.238	2.89	2.99	2.99	2.135	0.483
VEC	17	17	17	17	3.845	3.845
VPPSA	1.745	11.206	15.632	15.632	15.91	6.449
Vermont Marble	5	5	5	5	0.716	0.716
Total	32	194	219	225	225	63

Q5. How do the quantities of energy you are purchasing under the HQUS PPA compare to your current power purchases from Hydro-Quebec?

A5. BED does not currently receive any deliveries from Hydro-Quebec. BED's participation in this contract represents a new supply arrangement.

3. Section 248(b)(2) – Need

Q6. Section 248(b)(2) requires the Board to find that this PPA is required to meet the need for future demand for service which could not otherwise be provided in a more cost effective manner through energy conservation programs and measures and energy efficiency and load management measures. Please explain how this HQUS PPA satisfies this criterion.

1 A6. Given its lack of supply from either the existing Hydro-Quebec Firm Power Agreement
2 or the power contract for Vermont Yankee Nuclear Power Station, BED has been
3 making market power purchases for several years, while simultaneously seeking long-
4 term renewable supply. BED routinely purchases its supply needs in the short term
5 market on an annual rolling basis. In this short term market BED typically seeks 10 MW
6 to 15 MW Around-the-Clock (“ATC”) on a calendar year basis. BED also purchases up
7 to an additional 15 MW during specific months of the year. For example, BED’s peak
8 load occurs in the July/August timeframe, so additional supplies will be purchased for
9 those months. While BED has made short term purchases through 2012 and continues to
10 seek other long-term options, it is facing a significant gap in its power supply portfolio,
11 which amounts to approximately 40 % of current load by 2015. This supply gap is
12 graphically depicted on Exhibit BED-2.

13
14 BED anticipates taking delivery of 5 MW of energy under the proposed HQUS PPA
15 from 2015 to 2035 and an additional 4 MW from 2020 to 2038. The deliveries
16 beginning in 2015 will meet approximately 9% of BED’s annual energy requirements,
17 and the deliveries beginning in 2020 will meet an additional 8%. In total BED
18 anticipates up to 17.5% of its energy requirements under its “High DSM” IRP load
19 forecast being met by the HQUS PPA. BED anticipates the HQUS PPA being part of a
20 diverse supply mix composed of a combination of biomass, wind, and hydro resources.

1 In addition to the HQUS PPA BED holds an option to purchase the Winooski-1 hydro-
2 electric facility when the unit's VEPPI contract expires in 2013, and is actively
3 negotiating with two additional wind projects (in addition to its approved Vermont Wind
4 contract). Exhibit BED-3 illustrates BED's anticipated supply portfolio throughout the
5 HQUS PPA horizon when the HQUS contract and additional anticipated purchases are
6 included.

7

8 Q7. Please identify and describe the load assumptions used to develop Exhibits BED-2 and
9 BED-3.

10 A7. BED's approved 2008 IRP was based upon three distinct load forecasts reflecting
11 varying levels of future energy efficiency. As it has analyzed supply proposals BED has
12 repeatedly turned to those IRP load forecasts to validate its need assumptions. BED's
13 IRP recommended the "High DSM" case, combined with renewable supply, as the least
14 cost path forward. With 2008 and 2009 actual data now in hand, BED continues to
15 believe that the IRP load forecast is an accurate representation of future needs and
16 therefore used the IRP forecast, as approved, as its forecast basis through 2028 (the
17 ending date of the original IRP forecast). For the last ten years of the HQUS PPA
18 horizon BED simply used the TREND function in Excel to develop a linear regression of
19 future load expectations. BED's future supply requirements were then developed
20 against the "High DSM" case forecast.

1

2 Q8. Please identify and describe the demand savings assumed in your projections.

3 A8. As noted above, BED utilized the demand and energy savings estimates from its 2008
4 IRP as the basis for projecting future supply needs. These estimates have been validated
5 against actual results for 2008 and 2009, and similar to the forecast results continue to
6 reflect expectations within the bands anticipated in BED's IRP.

7

8 Q9. Do the projected demand reductions offset BED's need for more power supply?

9 A9. No. It is apparent from Exhibit BED-2 that the power from the HQUS PPA is needed
10 irrespective of the variations that may be experienced in consumer demand. It should be
11 noted that BED does not typically evaluate supply options like the HQUS PPA on a
12 demand basis. Since this contract is proposed as a base load type product BED evaluates
13 it against energy requirements, and as stated previously even under a High DSM load
14 forecast this additional supply is necessary.

15

16 Q10. How would this picture change if the Vermont Yankee facility is relicensed?

17 A10. BED's supply portfolio does not contain any Vermont Yankee supply at present, and
18 BED does not anticipate taking any supply in the future if the plant is relicensed. BED's
19 supply portfolio is unaffected by any future decisions related to Vermont Yankee.

20

1 **4. Section 248(b)(4) – Economic Benefit**

2 Q11. Section 248(b)(4) requires the Board to find that the HQUS PPA will result in an
3 economic benefit to the state and its residents. Please explain how this criterion is
4 satisfied.

5 A11. As noted above, BED has invested considerable effort in evaluating potential renewable
6 resource options to meet its long-term supply needs. BED is also active in the short term
7 supply markets making purchases to cover its immediate needs, through a so-called
8 hedge program approved by the Burlington Electric Commission. Under the hedge
9 program BED seeks to meet its supply needs through quarterly purchases designed to
10 cover 1/3 of BED's exposed position each quarter such that 100% of BED's future needs
11 are purchased 18-months in advance. This provides purchases at three separate pricing
12 points, and allows BED to predict its future power costs with a high degree of accuracy
13 entering each budget cycle. The one exception to this approach is in the event that
14 market prices fall sufficiently to allow longer term purchases at pricing low enough to
15 insure stable rates. Under this condition BED will extend its hedge program to buy
16 supply further into the future.

17

18 When BED evaluated the HQUS PPA terms it became apparent that the contract pricing
19 structure would provide an intermediary position between long-term renewable supply
20 contracts and BED's hedge program. Where most renewable developers require fixed

1 pricing for twenty to twenty-five years, typically at prices in excess of today's market
2 value, the HQUS PPA structure allows a portion of BED's renewable supply to have
3 some linkage to ISO New England market prices while still acting similarly to BED's
4 hedge program.

5
6 The HQUS PPA structure fit extremely well within BED's overall supply portfolio. It
7 allows BED to design a portfolio that utilizes long-term renewable supply at a fixed
8 price to meet its base load needs, layering on top the HQUS PPA with long-term
9 committed supply at pricing that moves in concert with the ISO New England pricing
10 but with dampened cost impacts versus the market, and finally utilizes the McNeil
11 generating station as BED's swing resource that will be bid into the market and have its
12 output float with market price changes. The overall structure will allow BED to meet its
13 renewable supply goals, while simultaneously having a supply portfolio that can take
14 advantage of market price movements.

15
16 Q12. Please describe and explain your analysis that lead to these conclusions.

17 A12. BED conducted several separate analyses to evaluate the potential impacts of the HQUS
18 PPA. First, BED utilized historical market pricing for the period beginning in 2003
19 when ISO New England first moved to locational pricing to gain an understanding of
20 how the contractual formulas would react to various pricing results. BED took spot

1 market prices from ISO New England's historical pricing files, and obtained historic
2 data about forward pricing from Goldman Sachs. This data was processed through the
3 HQUS PPA formulas to develop projections of what the PPA pricing would have been
4 had the PPA been signed at the initiation of the ISO New England locational markets.
5 These projected PPA prices were then compared to the forward pricing provided by
6 Goldman Sachs to evaluate whether holding the PPA during the historical period would
7 have been a positive decision. The results showed that for three of the five years the
8 PPA would have had pricing lower than what could have been obtained in the open
9 market at the time, and two of the years the PPA pricing would have been higher.
10 Because of the dampening affects of the PPA, it would have provided a positive benefit
11 over the entire period.

12
13 Secondly, BED utilized its IRP pricing assumptions and completed a decision-tree
14 analysis comparing the HQUS PPA against the various wind project proposals BED had
15 under consideration at the time. The contracts were evaluated over the same range of
16 natural gas, capacity, and renewable energy certificate assumptions BED had utilized in
17 its 2008 IRP. The results indicated that under most anticipated ranges of future
18 outcomes the HQUS PPA was preferable from a financial standpoint to entering the
19 long-term fixed price wind contracts. Under scenarios where Renewable Energy
20 Certificate prices rebounded to the \$40+ range and capacity prices in New England

1 increased, the wind contracts became preferable. This led BED to the proposed
2 portfolio structure utilizing both HQUS and future wind supply.

3
4 Q13. What does your analysis indicate about the HQUS PPA as a new resource addition to
5 BED's power supply portfolio?

6 A13. Overall BED strives to seek a supply portfolio that is renewable based, but has a
7 diversity of supply sources both in the sense of different contracts and different fuel
8 prices. BED also seeks to develop a variety of pricing options ranging from fixed price
9 long-term supply, to variable pricing, to market dispatchable. The HQUS PPA fits into
10 this philosophy very well in that it provides BED with a new counterparty, strengthens
11 BED's supply from hydroelectric fuels, and provides a variable pricing component to the
12 supply mix that has been missing. With total quantities ranging from 9% to 18% of
13 BED's future supply needs, the HQUS PPA appears to be an extremely good fit.

14
15 Q14. What are the major conclusions that can be drawn from your analysis and your
16 testimony?

17 A14. The HQUS PPA is expected to be an economic benefit to Vermont by providing a new,
18 long-term power resource at prices that are relatively stable and compare favorably to
19 the prices of other available resources. As a long-term stably priced resource with prices
20 favorable to market and indexed to market over time, the HQUS PPA represents a

1 complimentary addition to BED's power supply portfolio that compares very favorably
2 across a number of attributes, both economic and qualitative.

3
4 **5. Section 248(b)(6) – IRP**

5 Q15. Please explain how the HQUS PPA complies with BED's IRP.

6 A15. BED's power purchase under the HQUS PPA is consistent with the principles for
7 resource selection expressed in BED's 2008 IRP. As noted previously, BED's 2008 IRP
8 recommended a least cost path that included high levels of energy efficiency combined
9 with a 100% renewable supply mix. With the recent legislative changes designating
10 large scale hydroelectric power as renewable the HQUS PPA meets BED's requirement
11 for renewable supply. In evaluating the contract BED utilized the same assumptions
12 utilized in its 2008 IRP and completed a decision tree analysis comparing it to other
13 renewable resources under evaluation. The HQUS PPA compared very favorably to
14 other options. Lastly, BED's supply needs were developed utilizing the High DSM case
15 forecast recommended by the IRP. BED's analysis approach was essentially to insert
16 the HQUS PPA into its IRP analysis as closely as possible, and then evaluate whether
17 this supply option met the IRP goals. It passed the evaluation on every score.

18
19 The HQUS PPA was also selected by BED in furtherance of Vermont energy policy as
20 expressed in 30 V.S.A. §§ 202a, 218c, 8001(a), 8005, and the 2005 Vermont Electric

1 Plan, and the preferences expressed by customers as defined through the state-managed
2 public engagement process named “Vermont’s Energy Future.”

3

4 Q16. Does this complete your testimony?

5 A16. Yes.